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ABSTRACT

This report summarizes three studies conducted during the 1997-98 school year. The studies investigated the level of academic success CCSF students achieved, and if this success varied by student background (i.e. ethnic group, age, gender), educational goal and/or placement level. Also questioned was whether certain variables connected to the institution might be altered to positively affect students' success. Study subjects were students who took the English, English as a Second Language (ESL), or mathematics placement tests in 1993 and 1994. Students' progress was followed for three years after testing. Findings include: (1) roughly half of the placement test-taking populations placed at a basic skills level; (2) placement in basic skills varied by ethnic background, with 60 percent or more of African-American and Hispanic students placing at a basic skills level in English and mathematics, 25 percent of White students placing at a basic skills level in English, and 33 percent of Asian students placing at a basic skills level in mathematics; (3) between 18 and 34 percent of all students who took the placement tests had some success at CCSF in the three-year period following testing; (4) success differed by ethnicity and educational goal; and (5) students who registered concurrently for more within-discipline classes had higher pass rates. (Contains 18 graphs and 2 data tables.) (EMH)

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PROGRESS AND SUCCESS OF ENGLISH, ESL AND MATHEMATICS STUDENTS AT CITY COLLEGE OF SAN FRANCISCO

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This is the second report in a series of studies investigating the impact of matriculation services upon CCSF students. These studies were originally proposed during the 1995/96 academic year by Jean McTyre, then Dean of Matriculation and Assessment. Steven Spurling conducted the studies under the joint sponsorship of the Office of Research, Planning and Grants and the Office of Matriculation and Assessment. This report summarizes Mr. Spurling's findings.

Additional copies of this report as well as full statistical tables for all five of the matriculation studies (approximately 150 pages each) are available at this address:

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INTRODUCTION

This report, conducted by the Office of Research, Planning and Grants in cooperation with the Office of Matriculation, investigates the level of educational achievement students reach while at City College of San Francisco (CCSF). It uses as its base students who took the English, English as a Second Language (ESL) or Mathematics placement tests in 1993 and 1994. In 1993 and 1994, 6088 and 5622 students respectively took the English test, 5081 and 4883 took the ESL test, and 11297 and 10796 took the Mathematics test. These students were followed for three years after testing in order to identify how they progressed.

Once students took the placement tests did they enroll at CCSF? If so, did they enroll in a course that was the focus of the placement test they took? If they took such a course, did they pass it? If they passed it, did they take other courses, and if so, how far did they get in the sequence? Did they reach and pass a transfer level course, or if they did not get that far, did they reach and pass a degree applicable level course? Did those who placed in basic skills pass a course that defined the end of the basic skills sequence? Lastly, if they experienced none of these outcomes, were they still enrolled in the last semester examined, and were they taking courses in the discipline in which they tested three years previously?

In addition, this study examines whether the educational levels students achieve at CCSF vary by student background (i.e. ethnic group, age, gender), educational goal and/or placement level. Moreover, while a student's success in achieving a particular educational level may be related to his or her own background, there may be variables connected to the institution that can be altered to positively affect students' success. If, for example, success is related to the number of courses that a student takes within a discipline, the institution can take steps to set up a structure that encourages students to study more intensively within a discipline. The study looks at the relationship between achieving an educational level and three variables connected to the institution: 1) intensity of study (i.e. number of courses or units taken within the same discipline), 2) placement compliance and 3) delay in course enrollment.

HIGHLIGHTS

Placement, enrollment, and progress of the students who took the placement tests in English, ESL and Mathematics in 1993 and 1994 at City College of San Francisco (CCSF) differed on many levels:

- 11,297 students took placement tests in 1993 and another 10,796 in 1994 with roughly 6,000 of those students taking the English, and 5,000 taking the ESL Placement tests. Virtually all students took the Mathematics Placement test.

- Twenty percent of students who took the placement tests failed to enroll at CCSF.

- Roughly half of the placement test taking populations placed at a basic skills level.

- Placement in basic skills varied by ethnic background. Sixty percent or more of African-American and Hispanic/Latino students placed at a basic skills level in English and Mathematics; a quarter of White students placed similarly in English; and one third of Asian students placed at a basic skills level in Mathematics.

- Between 18 and 34 percent of all students who took the placement tests had some success[1] at CCSF in the three year period following testing. This figure falls to between 12 and 23 percent for basic skills placed students. For basic skills students whose educational goal is to get a degree, the percentage rises to between 23 and 43 percent.

- Success also differed by ethnicity. In English, a quarter or more of Asian and White students passed a CSU level course. Fewer than 20 percent of African-American and Hispanic/Latino students attained a similar goal. In Mathematics the differences were even more pronounced. Twenty percent of Asian students passed a CSU level course. Only eight percent of White, four percent of Hispanic/Latino, and two percent of African-American students did similarly. In ESL, about twelve percent of White students passed a CSU level course while six percent of Hispanic/Latino students did similarly.

- Differences in success varied significantly by educational goal. Those students whose goal was a degree were more likely to achieve successful outcomes[2] than those students whose goal was job-related. Differences in success by age and gender were small.

- In all disciplines and no matter how students initially placed, the success students had in their first course was strongly related to their subsequent educational level of achievement. Students who passed a first course were more likely to enroll in a higher course within the discipline sequence as well as to complete successfully more advanced courses. Students who enrolled in a second higher course were much more likely to pass that course than students who re-enrolled in the same course.

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[1] Success is defined as achieving specific educational levels. These levels vary by discipline but include a range from completing a basic benchmark course to taking CSU or UC transferable courses. See Table 1, page 5 of the report for clarification.

[2] ibid

- Success in a first course varied by discipline. Roughly 60 percent of students who enrolled in a first ESL course passed; this compares to 50 percent in English and 45 percent in Mathematics. Passing percents were similar in ESL and English for basic skills placed and all students. However in Mathematics 35 percent of basic-skills placed students passed a first course versus 48 percent of the more highly placed students.

- Success in a first course differed by ethnicity. While about 50 percent of White and Asian students passed a first course in English and Mathematics, 46 percent or fewer African-American and Hispanic/Latino students did similarly. The difference in passing percentage was most noticeable in Mathematics where fewer than a quarter of African-American and about a third of Hispanic/Latino students passed a first course. Differences in first course grade outcome by ethnicity were minimal in ESL. Differences in success by other background variables were also minimal in all three disciplines.

- Of the three institutional variables studied, "intensity of study" was most related to student success in first course grades. Intensity of study is defined by the number of courses or units a student takes. Students who enrolled in multiple courses in a discipline within the same term, or students placed in a multiple-course sequence who took all courses concurrently did better than students who enrolled in only one course within a discipline. The difference was substantial with roughly a 15 percent passing rate increase. Similarly students who enrolled in more units did better than students who enrolled in fewer units. Passing percent rose about four percent per unit as students enrolled in more units up to about a seven or eight unit load within a discipline. It then fell at higher unit loads. Other institutional variables examined were less strikingly related to success. These were placement compliance and delay in taking a first course.

OUTCOMES: LEVELS OF EDUCATIONAL ACHIEVEMENT AT CCSF

The mutually exclusive levels of educational achievement or outcomes used in this study are presented in Table 1 (next page). Though there are eight outcomes listed for all disciplines, only six of the eight apply to each discipline because possible outcomes vary somewhat from discipline to discipline. Benchmarks were set in consultation with department chairs from the three disciplines and are based on the curricula at CCSF.

The highest outcome is a UC transferable level which is only defined for English. Students who successfully pass English 1B or English 40 are said to have reached a UC transferable level. The next highest level is a CSU transferable level and is defined for all disciplines. Students who pass English 1A, 96 or 94 are said to have reached a CSU transferable level in either English or ESL. In Mathematics, students who pass Mathematics 70 or higher, Economics 5, or Psychology 5 are said to have reached a CSU transferable Mathematics level.

In a similar fashion, an Associate of Arts level is defined for ESL and a degree applicable level is defined for ESL and Mathematics. A basic skills level is defined for English and Mathematics but not for ESL.

These outcomes are considered positive outcomes. On the other hand, "Courses-in-progress" is considered a neutral outcome. (Students in this category were taking courses in the discipline that was the focus of the placement test, however, in the last semester examined they had still not attained any of the positive outcomes listed above.) The last two outcomes were "No enrollment" and "no course." These outcomes are considered negative outcomes. "No enrollment" means that students either did not enroll at CCSF after taking the placement test or they disenrolled from CCSF at the same time they ceased taking placement-discipline courses without having attained any of the positive outcomes listed in Table 1. "No course" means that students enrolled at CCSF but failed to take a course in the discipline that was the focus of the placement test they took. Or secondly, they ceased taking placement-discipline courses without having attained a positive outcome, but they remained enrolled at CCSF.

Table 1

Educational Outcomes of Test Takers

OUTCOME LEVEL	ENGLISH BENCHMARK COURSES	ESL BENCHMARK COURSES	MATH BENCHMARK COURSES
POSITIVE OUTCOMES			
UC Transferable	1B, 40	Not defined	Not defined
CSU Transferable	1A, 96, 94	1A, 96, 94	70,75,80,90,92Up Econ 5 & Psych 5
Associate-of Arts	Not defined	82	Not defined
Degree Applicable	Not defined	52, 62, 72	840, 850, 855, 860
Basic Skills	92	Not defined	Math E Bus G, H, J, 66&68
NEUTRAL OUTCOME			
Courses-in progress at end of three year study	Enrollment in last semester	Enrollment in last semester	Enrollment in last semester
NEGATIVE OUTCOMES			
No Course within discipline of placement test	Enrolled at CCSF but no English course	Enrolled at CCSF but no ESL course	Enrolled at CCSF but no math course
No Enrollment at CCSF	No enrollment or disenrollment w/o successful completion of a benchmark course	No enrollment or disenrollment w/o successful completion of a benchmark course	No enrollment or disenrollment w/o successful completion of a benchmark course

Student paths through the discipline sequences were charted by following them every time they enrolled in a course in the discipline in which they took a placement exam. The course, semester, and grade were noted. After following the students for three years, they were assigned an outcome level (e.g., UC transferable, CSU transferable) which was determined by what courses they had completed. These outcome levels were then examined by placement level, ethnicity[1], and first course grade. These placement levels are summarized in Table 2 below.

Table 2

Placement Levels in English, ESL and Mathematics and the Courses that Define Them

PLACEMENT LEVEL	ENGLISH	ESL	MATHEMATICS
CSU Level	1A, 96, 94	not defined	90 and Up
AA Level	Not defined	1A, 96, 94, 82	Not defined
Degree Applicable	Not defined	52, 62, 72	840, 850, 855, 860, 92
Basic Skills	L, 90, 92	22, 32, 42	E, E&840

[1] The many categories of ethnicity on the CCSF registration form were regrouped into five major ones. These are Asian, African American, Hispanic/Latino, Other, and White.

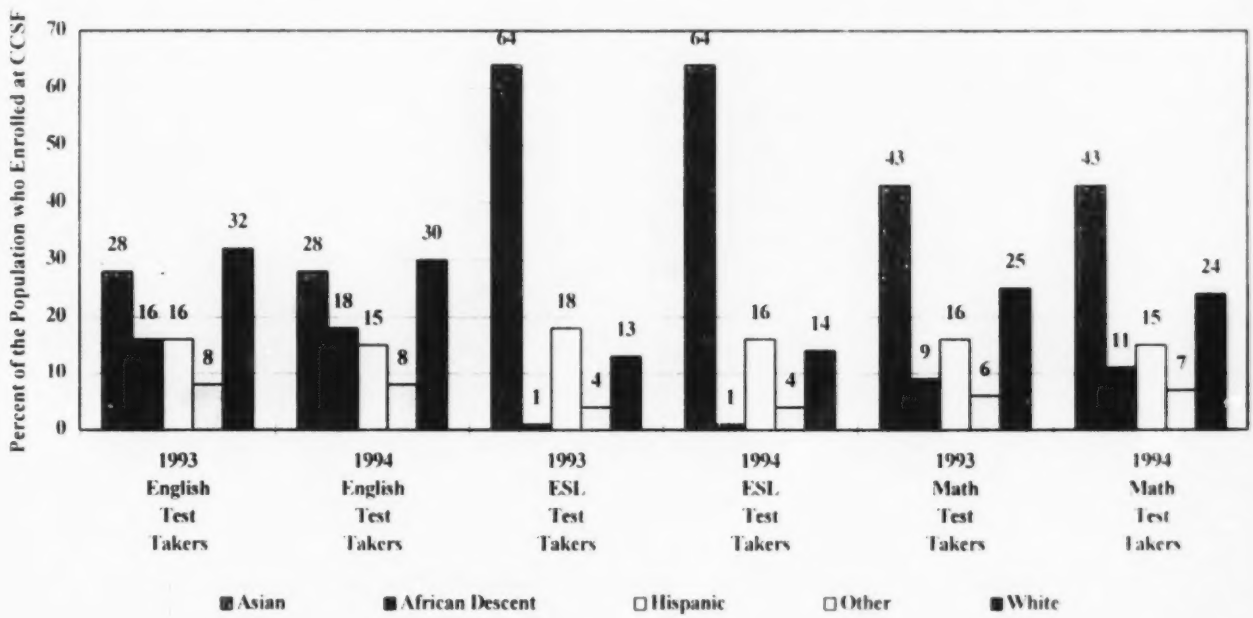
THE BACKGROUND AND PLACEMENT OF TEST TAKERS

The major findings from this study are presented in separate graphs for each discipline. To save space, background information, minor findings and clarifications are presented in the same graphs for all three disciplines. No attempt, however, has been made to compare disciplines though similar information exists for each.

Graphs 1, 2 and 3 (see the next two pages) present information on the ethnicity and placement of students in English, ESL and Mathematics. Graph 1 presents the ethnicity of the populations. These varied greatly from ESL to Mathematics. Asians were the largest group in two of the three disciplines making up 64 percent of ESL students, 43 percent of Mathematics students and 30 percent of English students. Graph 2 presents the placement of students in all three disciplines. Roughly half of students tested received a basic skills placement. In 1994, 37 percent of ESL students, 50 percent of Mathematics students, and 55 percent of English students placed in basic skills. Graph 3 presents placement by ethnicity. In English and Mathematics, 60 percent or more of African-American and Hispanic/Latino students received a basic skills placement. A quarter of White students in English and a third of Asian students in Mathematics received a similar basic skills placement.

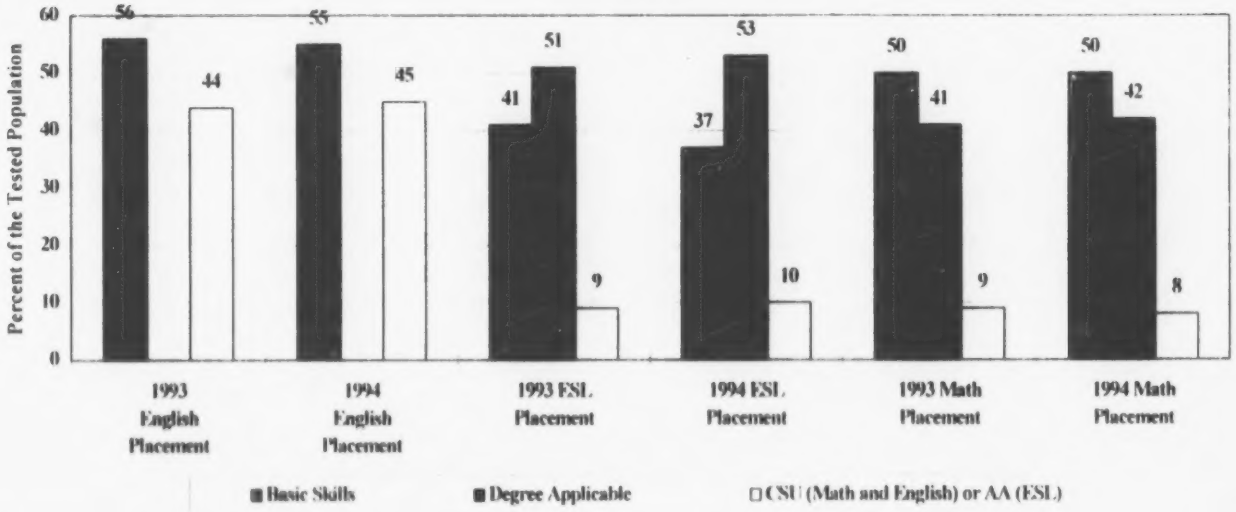
Graph 1

The Ethnicity of 1993 and 1994 Test -Taking Populations in English, ESL and Mathematics



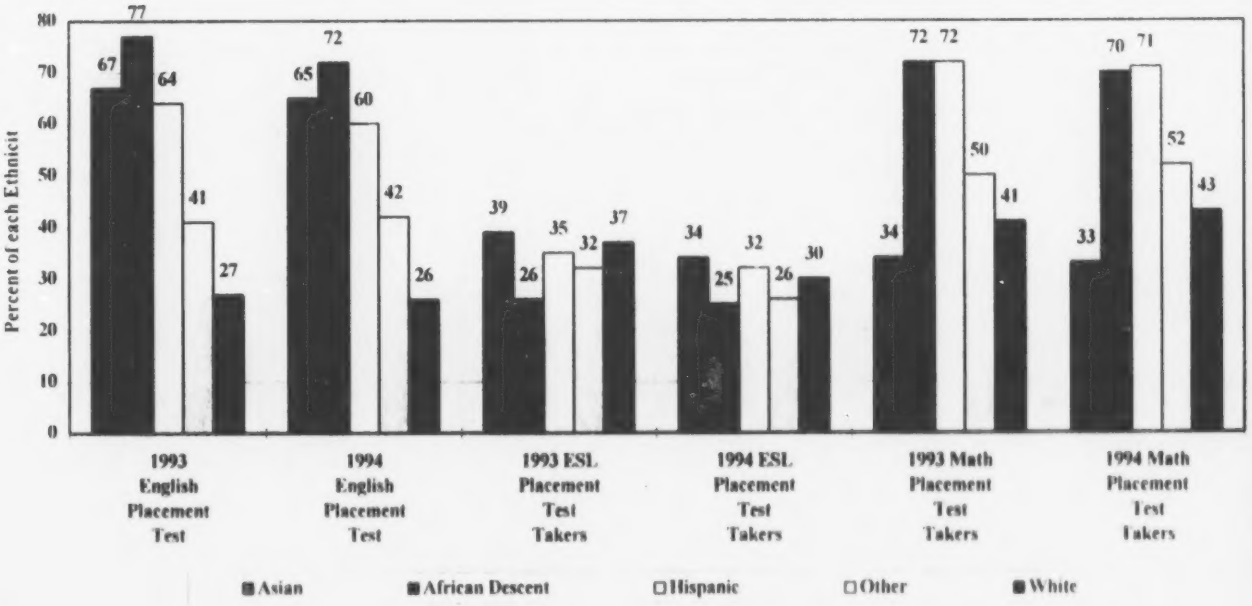
Graph 2

The Placement of 1993 and 1994 Test-Taking Populations in English, ESL and Mathematics



Graph 3

The Percent of Each Ethnicity that received a Basic Skills Placement in 1993 and 1994

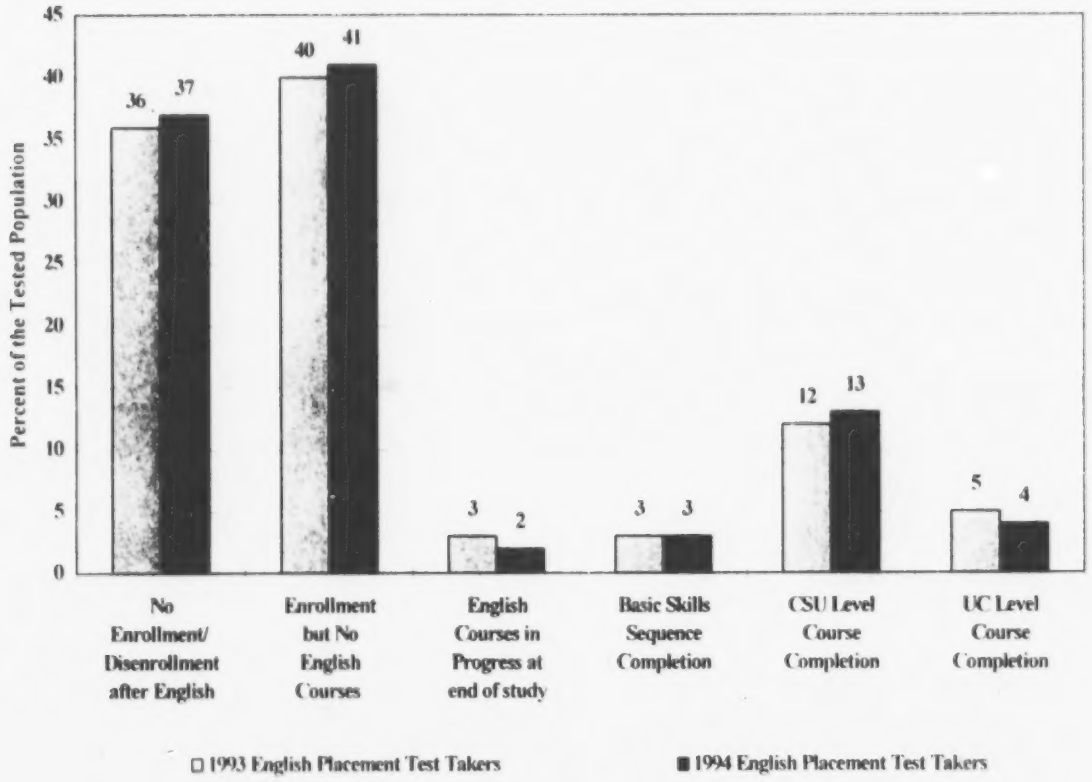


ENGLISH

Graph 4 shows the percent of all English placement test takers who reached each of the levels of success. Twenty percent of English test takers had a positive outcome to placement. The largest part of this 20 percent of students passed a CSU level course. Slightly more than three quarters of test takers either failed to enroll at CCSF, disenrolled without successfully passing an English benchmark course or enrolled without taking an English course (Graph 4). Over 50 percent of all outcomes occurred in the first term with an additional 25 percent of outcomes in the second. Few outcomes occurred after three or four semesters of English courses. Outcomes in 1993 and 1994 were quite similar.

Graph 4

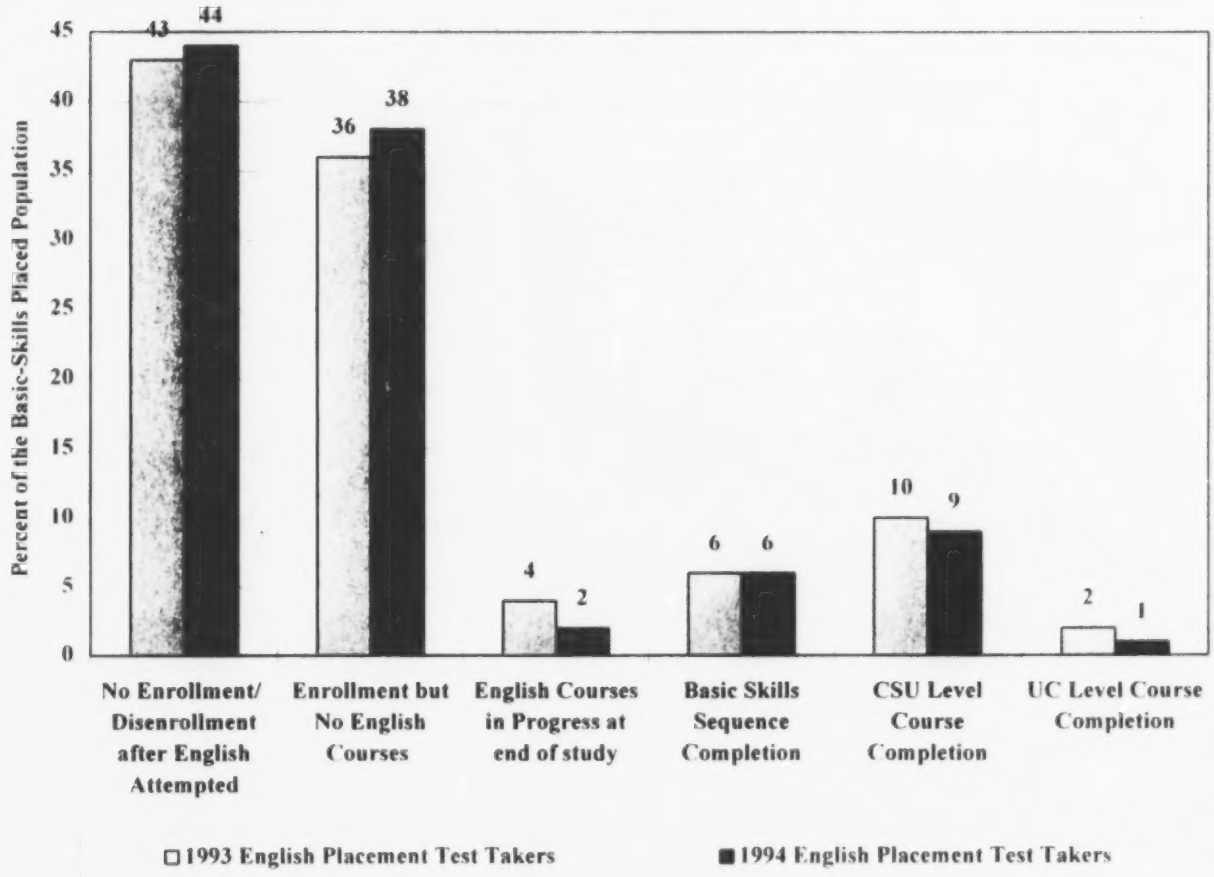
The Educational Outcome in English of 1993 and 1994 Test Takers in the Three Year Period Following Placement Testing



Graph 5 looks at students who placed in basic skills. Students who placed in basic skills achieved educational levels in English that were only slightly lower than what the overall student population achieved for CSU level courses. (Compare Graph 4 with Graph 5). However, for UC level courses the basic skills placed students' success was less than half that of the overall population.

Graph 5

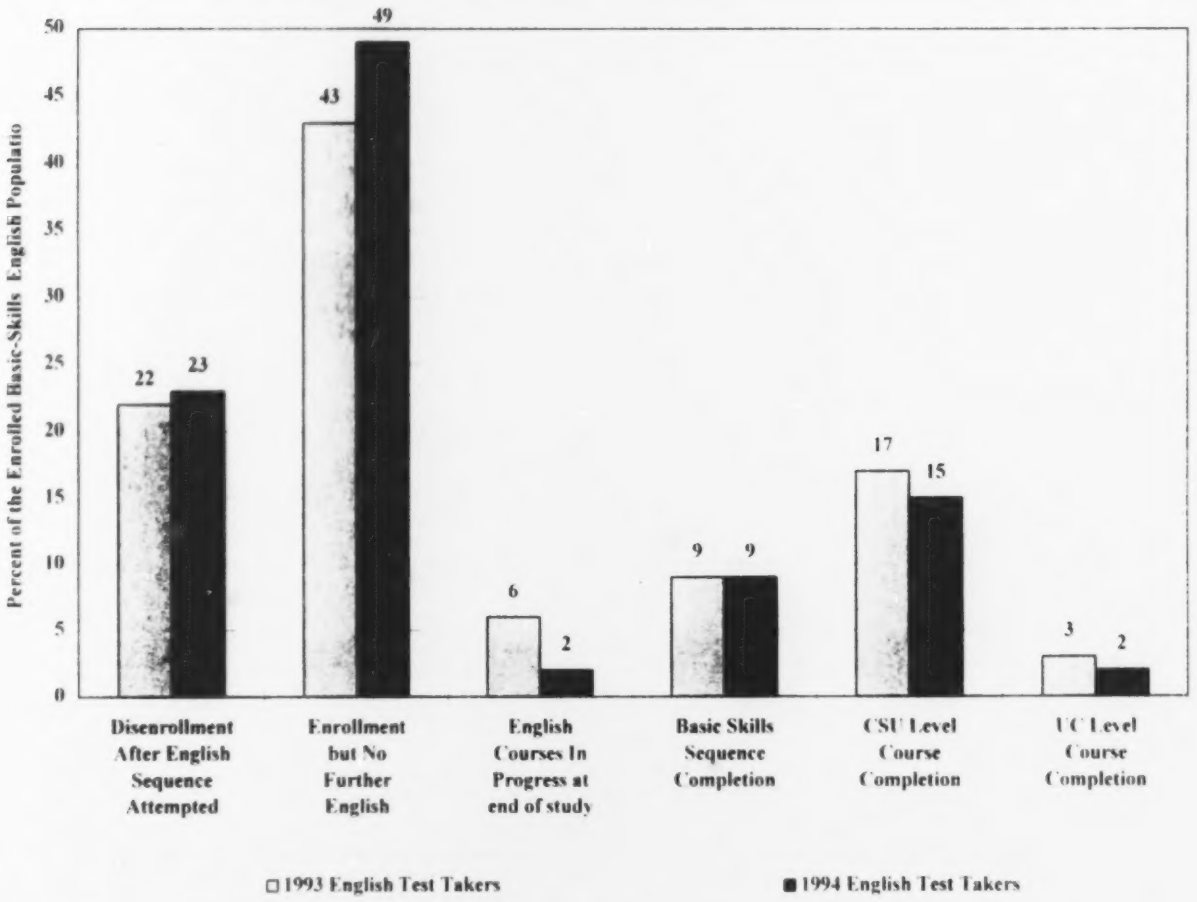
The Educational Outcome in English of 1993 and 1994 Basic-Skills Placed Test Takers in the Three Year Period Following Placement Testing



A closer look at basic skills students was taken by restricting the analysis to basic-skills placed test takers who said their goal was either a two or four year degree (see Graph 6). Here, 29 percent of 1993 and 26 percent of 1994 test takers had a positive educational outcome. Nine percent passed the basic skills sequence; another 15 to 17 percent passed a CSU level course; 3 percent passed a UC level course. However, 43 percent (1993) and 49 percent (1994) of this group took no English course upon enrollment at CCSF. An additional 22 percent (1993) and 23 percent (1994) disenrolled after taking English courses but without passing an English benchmark course.

Graph 6

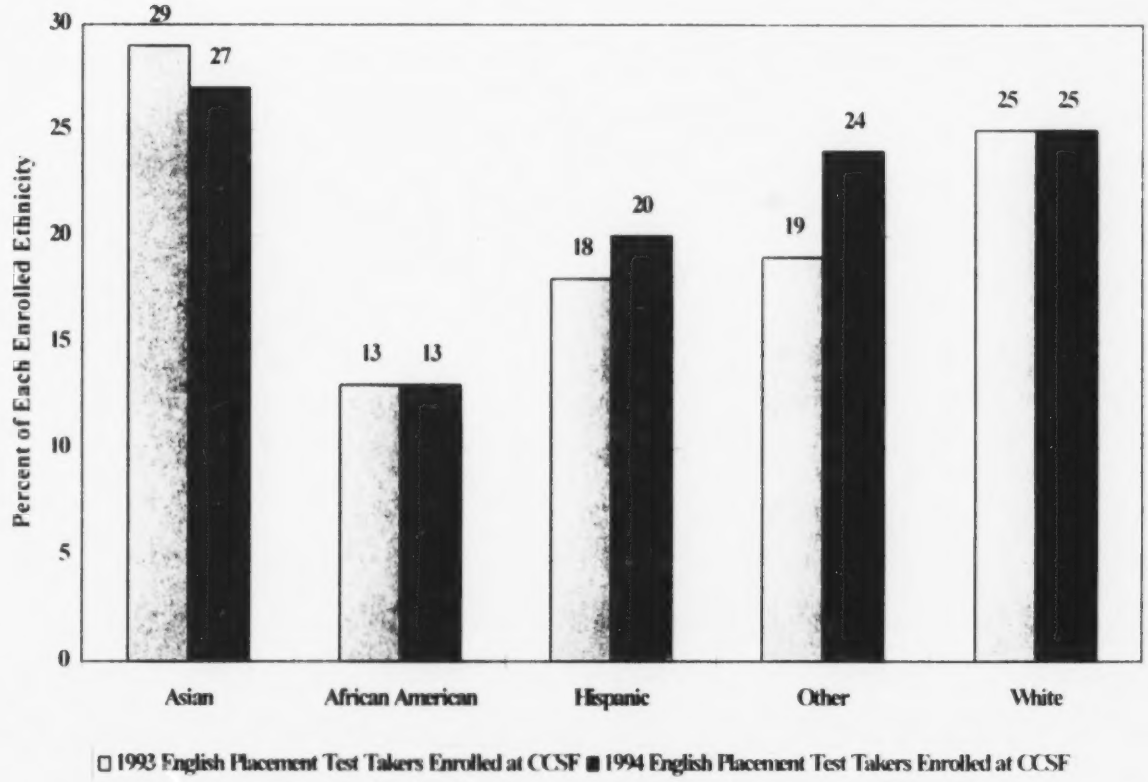
The Educational Outcome in English of Basic-Skills Placed Students Who Say Their Goal is a Degree



Graph 7 shows a significant relationship between educational outcome and ethnicity. Ethnicities varied in the percentage of each group passing a CSU level course. Achieving this benchmark were roughly 28 percent of Asian, 25 percent of White, 19 percent of Hispanic/Latino and 13 percent of African American students.

Graph 7

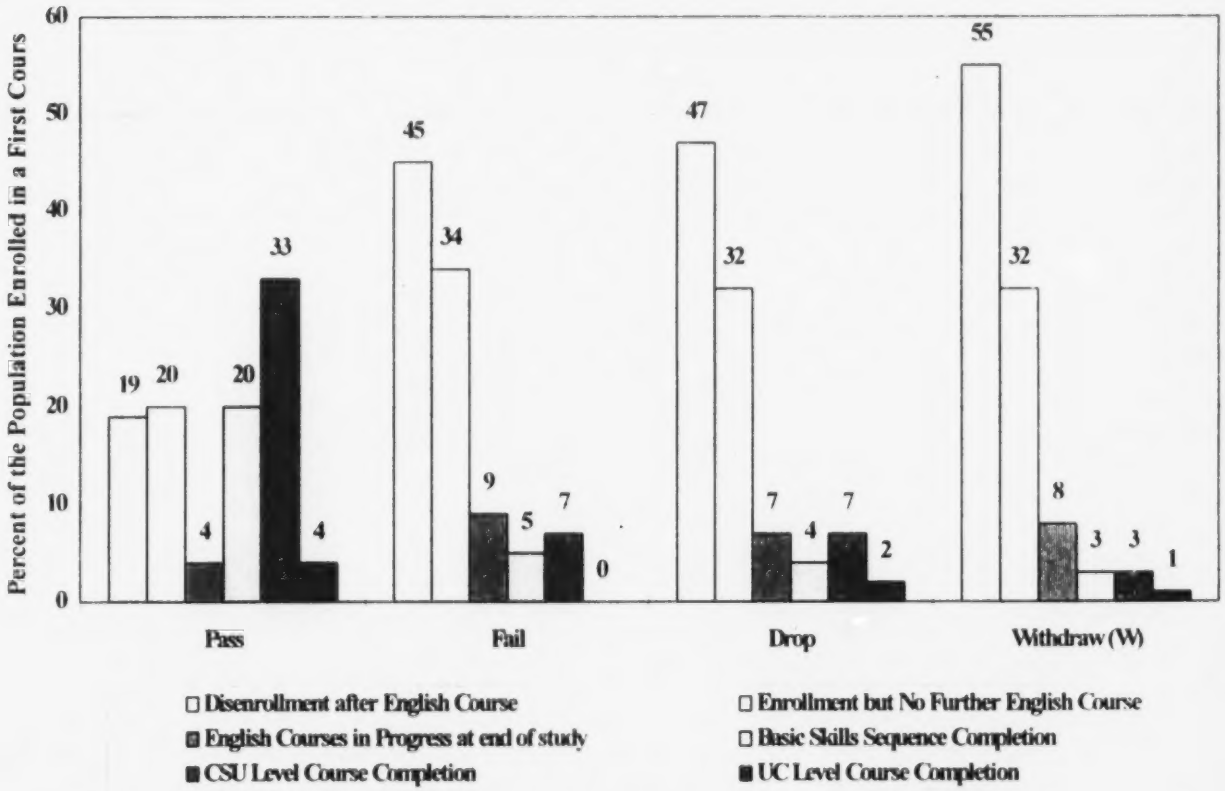
The Successful Completion of a CSU Level or higher Course in English by Ethnicity



Graph 8 presents the relationship between first course grade outcome and educational outcome for basic-skills placed students. Thirty seven percent of the students who passed their first English course went on to successfully complete a CSU or UC level course. Only nine percent who dropped, seven percent who failed, and four percent of students who withdrew from a first course went on to attain a similar goal. On the other hand, while 39 percent of basic-skills placed students who passed a first course failed to achieve a positive outcome, that figure jumps to 79 percent or more for students who failed, dropped or withdrew from a first course.

Graph 8

The Educational Outcome in English of Basic-Skills Placed Students by First Course Grade Outcome (1993 and 1994 combined)



The English placement test-taking populations of 1993 and 1994 were also broken down and tracked by a number of other variables. These variables included such institutional variables as placement compliance, delay in enrollment in a first and second course, grade outcome in the first six sequential courses, unit and course load within each discipline and retention at CCSF. They also included background variables of age, gender and educational objective. While these variables and their relationship to educational outcome are not graphed in this report, a brief mention of the findings relating to them is presented here. Of the background variables of age,

ethnicity, gender and educational objective, ethnicity was the most strongly related to placement, retention and success. Asians completed a CSU level or higher course in larger percentages than other ethnicities (see Graph 7, page 12). Perhaps one of the reasons their success rate was higher was that they stayed at CCSF longer than other ethnicities. While White students received much higher placements, and while they did better in a first course than Asians, they were retained at CCSF at half the Asian rate. This finding warrants further research.

Students attending for job-related reasons placed lower, were retained less well and had less success than students whose goal was a degree or who were attending for personal reasons. Successful completion of a CSU level course was slightly better for females and notably superior for degree seekers.

Institutional variables also affected success. Already mentioned in Graph 8 was the relationship between the passing of a first course and educational outcome. How students did in a first term English course was the most important factor in long term success. Seventy one percent of students who passed a first course went on to a second term in English, while less than half of students who failed or withdrew from their first term course went on to a second term in English. Similarly, 64 percent of students who passed a first term course passed a second course; only 30 to 40 percent of students who withdrew, dropped, or failed in their first term course, passed a second course. Last, students who subsequently enrolled in a higher level course were more likely to pass that course than students who re-enrolled in the same course again. This was the pattern that eventually led to the successful completion of a transfer level English course. Thirty seven percent of basic-skills placed students who passed their first English course went on to reach this benchmark. Only seven percent of basic skills placed students who failed or withdrew went on to achieve a similar feat.

Given that first course success is important, the question is how successful were students in a first course? In English, 48 percent of both basic skills placed and more highly placed students passed a first course. This percent may seem low but it must be remembered that it is a percentage of all students including those who passed, failed, withdrew or dropped an English course. Moreover, differences in success existed by ethnicity. Over 50 percent of White and Asian students passed a first course. This compares to 45 percent of Hispanic/Latino students and 38 percent of African Americans.

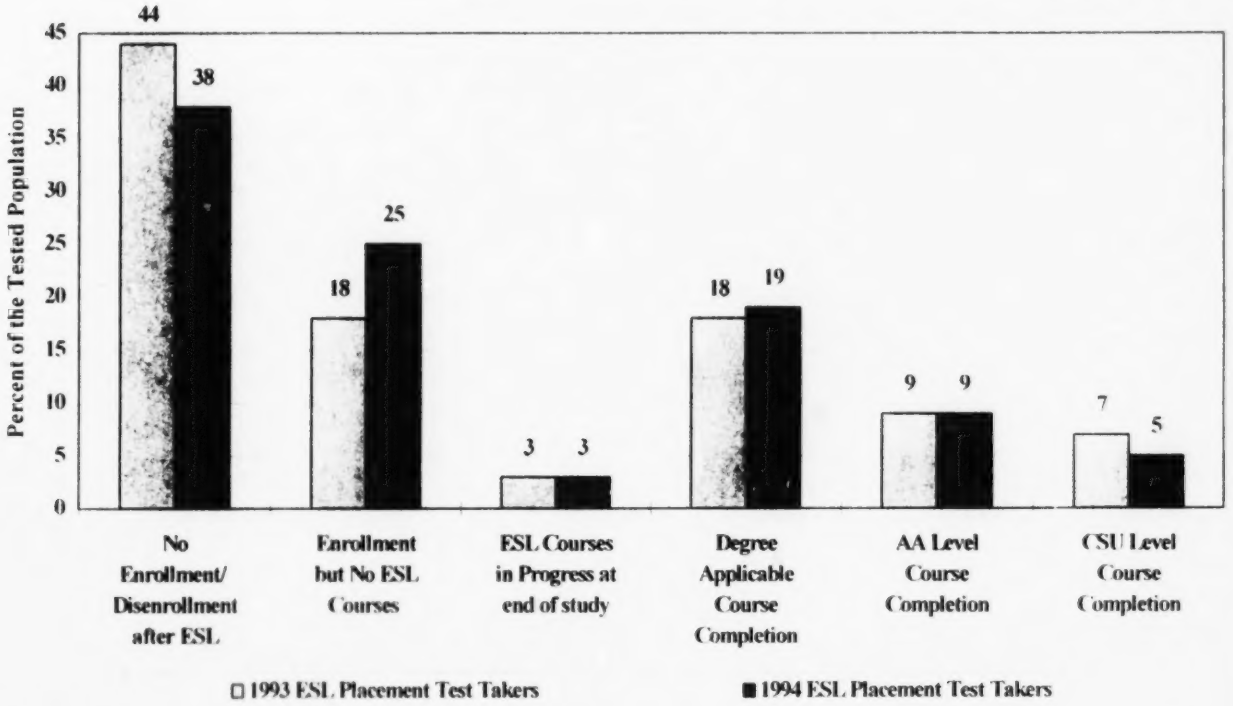
What institutional variables are related to first term course success in English? Three variables were examined: placement compliance (i.e. enrollment in the correct course), delay in taking a first course, and number of enrolled courses and enrolled units. Passing a first course in English is somewhat related to placement compliance and immediate enrollment. However, the number of classes enrolled in is more strongly related to first course success. The percent of students passing their first English course increased from 47 to 59 percent for those students enrolled in two English courses versus only one. Moreover, students who placed in the only multiple concurrent course offering, the English 90 and 9 level, passed more frequently when they enrolled in both courses versus only one. The passing percent increased from 50 percent for those students enrolled in one of the two courses to 60 percent for students who enrolled in both. The intensity of study within English is positively related to success. Further research could help us show a causal effect; that is, that taking more courses or units (up to a point), or taking more courses within the same discipline concurrently, will increase student success.

English as a Second Language

ESL educational outcomes did not vary much between 1993 and 1994. Thirty-four percent of ESL test takers in 1993 and 31 percent in 1994 passed a degree applicable course or higher level ESL class with the bulk of these student only passing a degree applicable course. More than 60 percent, however, either failed to enroll at CCSF, disenrolled without successfully passing an ESL course or enrolled without taking an ESL course (Graph 9). Slightly more than 50 percent of all outcomes occurred in the first term with an additional 20 percent of outcomes in the second. The rest of the outcomes were spread out over the next three terms of ESL courses.

Graph 9

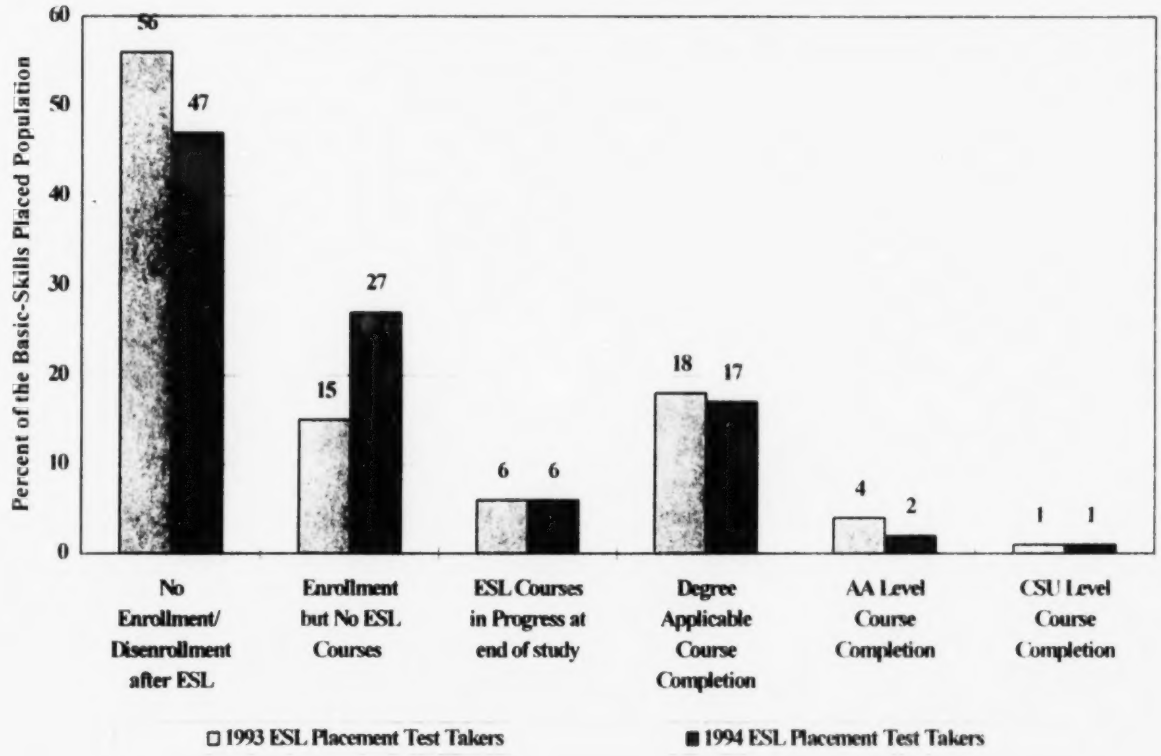
The Educational Outcome in ESL of 1993 and 1994 Test Takers in the three year period following Placement Testing



Positive educational outcomes were less frequent for basic-skills placed ESL test takers. (Graph 10) Twenty-three percent of 1993 and 20 percent of 1994 basic-skills placed test takers passed a degree applicable or higher level course. While basic-skills placed test takers were similar to all ESL placed students in their successful completion of a degree applicable level course, they were half as likely to successfully complete the AA level course, and not likely at all to pass an English core (CSU level) course.

Graph 10

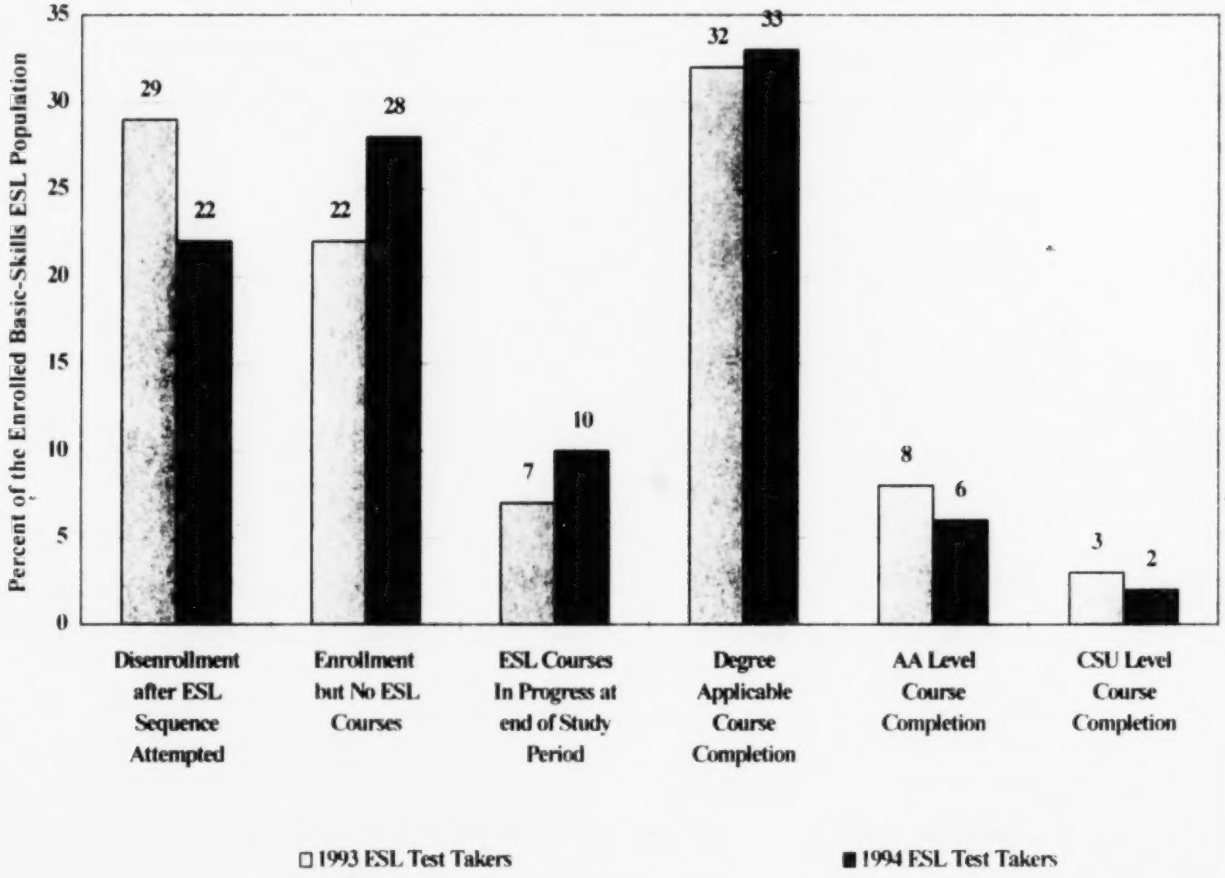
The Educational Outcome in ESL of 1993 and 1994 Basic-Skills Placed Test Takers in the Three Year Period Following Placement Testing



A closer look at basic skills students (Graph 11) was taken by restricting the analysis to basic-skills placed test takers who said their goal was either a two or four year degree. Here 41 to 43 percent successfully completed a degree applicable or higher level course. However, most of these (32 - 33 percent) passed one of the courses that defined the lowest achievement level; six to eight percent passed an AA level course; and only two to three percent passed an English core (CSU level) course. Between 22 and 28 percent of this group took no ESL course upon enrollment at CCSF. An additional 22 to 29 percent disenrolled after taking an ESL course without successfully completing any of the benchmark ESL courses.

Graph 11

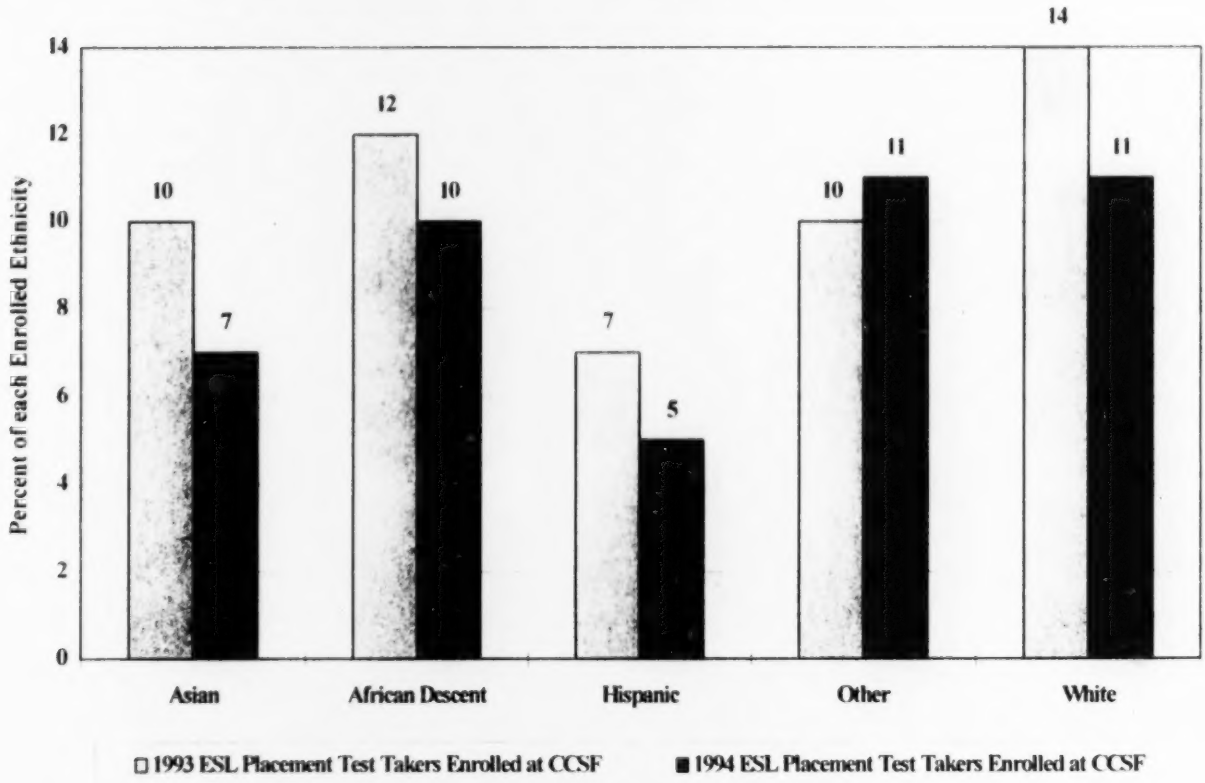
The Educational Outcome in ESL of Basic-Skills Placed Students Who Say Their Goal is a Degree



The relationship between educational outcome and both ethnicity and first course grade outcome was significant and substantial. Ethnicities varied in the percentage of each group passing a CSU level course. Achieving this benchmark were 11 to 14 percent of White, 10 to 12 percent of African descent, 7 to 10 percent of Asian and 5 to 7 percent of Hispanic/Latino students (Graph 12).

Graph 12

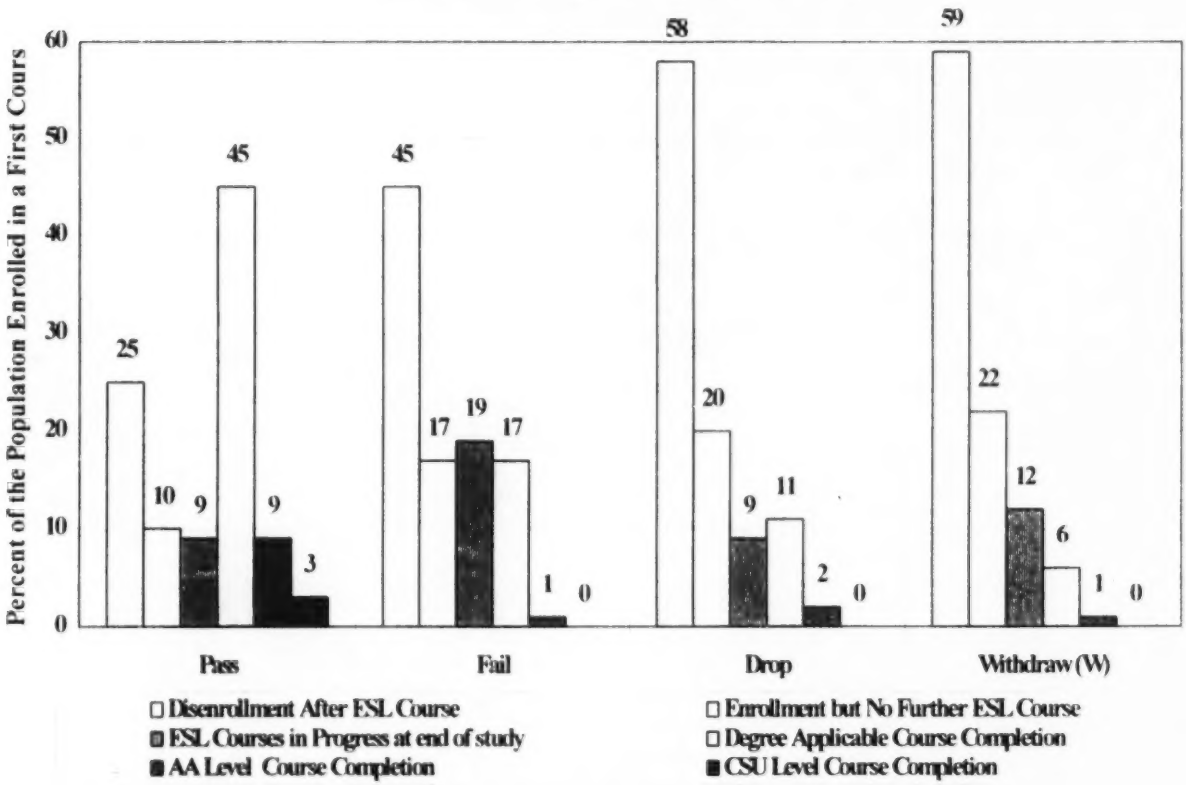
The Successful Completion of a CSU Level or Higher Course in ESL by Ethnicity



Basic-skills placed students also varied in their educational outcome by first course grade outcome (See Graph 13.) Twelve percent of basic-skills placed students who passed a first ESL course went on to successfully complete an AA level or higher course, but only one percent of students who failed or withdrew, and two percent of students who dropped a first course went on to attain a similar goal. On the other hand, while 35 percent of basic-skills placed students who passed a first course failed to achieve a positive outcome, that figure jumps to 62 percent for students who failed a first course then rises to 80 percent and more for students who either dropped or withdrew from a first course .

Graph 13

The Educational Outcome in ESL of Basic-Skills Placed Students by First Course Grade Outcome (1993 and 1994 combined)



The ESL placement test-taking populations of 1993 and 1994 were also analyzed by a number of other variables. These included such institutional variables as placement compliance, delay in enrollment in a first and second course, grade outcome in the first six sequential courses, unit and course load within ESL, and retention at CCSF. Also included were background variables of age, gender, educational objective and educational origins. While these variables and their relationship to educational outcome are not graphed in this report, a brief mention of the findings relating to them is presented here. When the background variables of ethnicity, age, gender, and educational objective and origins are examined for trends in placement, retention

and success, a mixed picture results. While students taking classes for personal reasons received a basic skills placement more frequently, little difference existed by age, or gender. A large difference existed in successful completion of a CSU level course by educational goal. Degree-seeking students had higher completion rates. Moreover, students who came from noncredit classes were less successful than students who came from either foreign or U.S. high schools. In particular while students coming from U.S. high schools did poorly their first semester, they had good long term success mainly because they were well retained. Less well retained after initial failure were students from noncredit.

Institutional variables also affected success. As noted in Graph 13 a relationship exists between passing a first course and educational outcomes. How students did in a first term ESL course was the most important factor in predicting long term success. The path to success was tracked from course to course. Eighty-six percent of students who passed a first course went on to a second term in ESL. This compares to 70 percent of students who failed a first course, and between 50 and 60 percent of students who dropped or withdrew from their first term course. Similarly, over 70 percent of students who passed a first term course, passed a second course; between a third and a half of students who withdrew, dropped or failed a first course, passed a second. Last, students who enrolled in a following higher course were more likely to pass that course (70 percent passing) than students who re-enrolled in the same course again (55 percent passing). This was the pattern that eventually led to the successful completion of a transfer level ESL course. Twelve percent of basic-skills placed students who passed their first ESL course went on to reach this benchmark. Only one percent of basic skills placed students who failed or withdrew went on to achieve a similar feat.

Given that first course success is important, the question is how successful were students in a first course? In ESL, over 60 percent of both basic skills placed and more highly placed students passed a first course. This percent may seem low but it must be remembered that it is a percentage of all students including those who passed, failed, withdrew or dropped an ESL course. Small differences existed by ethnicity. More than 65 percent of White and Asian students passed a first course. This compared to 58 percent of other ethnicities. Interestingly, once ESL students got through the ESL sequence and moved into the English sequence, they passed these classes in percents equivalent to native speakers.

What institutional variables affect first term course success in ESL? Placement compliance, delay in taking a first course, and number of enrolled courses and enrolled units were examined. In ESL, enrollment in the correct course and immediate enrollment were related to passing a first course. However, the number of classes students enrolled in more strongly related to first course success. The percent of students passing their first ESL course or sequence increased from 57 percent for one course to 75 percent for those students enrolled in three ESL courses. Moreover, in an examination of students who placed in multiple course sequences, the percentage of those students passing who enrolled in all courses versus only one course increased roughly 15 percent. When unit load in ESL was checked, passing percentage increased from 55 percent for students taking two units to 75 percent or more for students enrolled in seven to eight units. Passing percent then fell to 60 percent at nine and higher unit loads. Is there something in the intensity of study that promotes success?

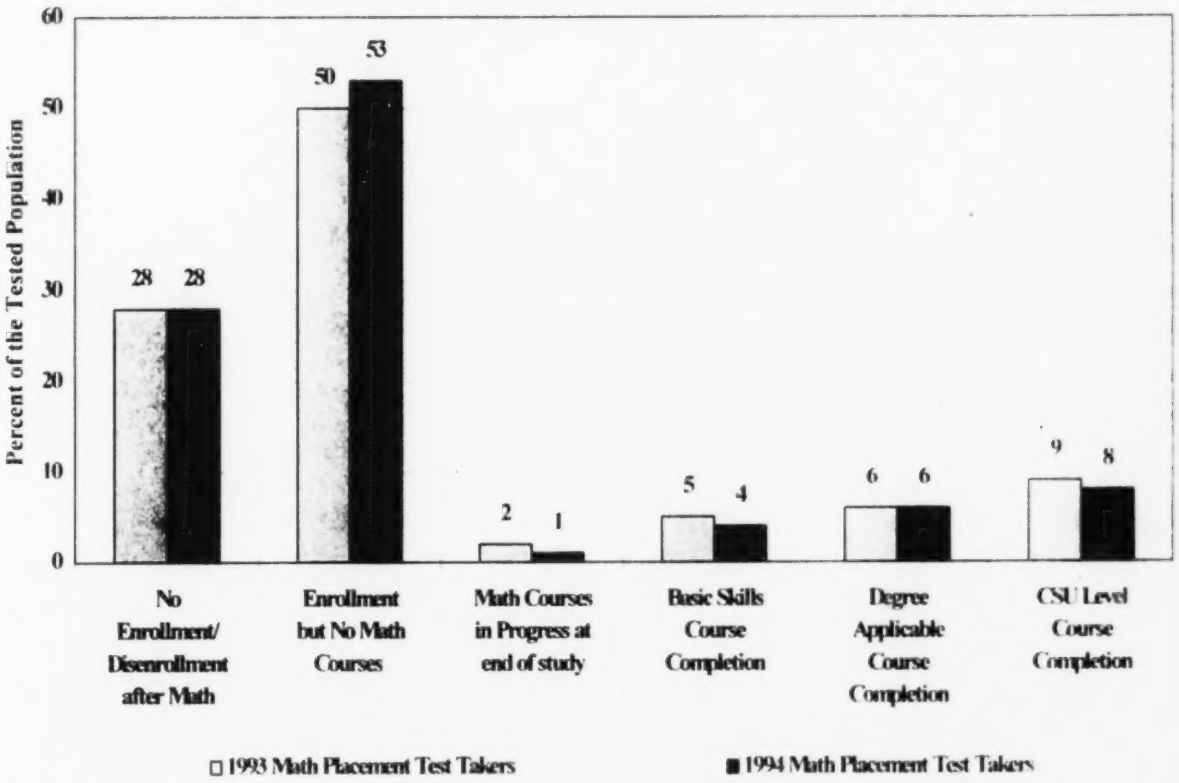
MATHEMATICS

In Mathematics, 1993 and 1994 educational outcomes were quite similar (see Graph 14). Twenty percent of 1993 and 18 percent of 1994 Mathematics test takers passed at least a basic skills level Mathematics class. The largest percentage of these passed a CSU level course. However, more than three quarters either failed to enroll at CCSF, disenrolled without successfully passing a Mathematics course or enrolled without taking a Mathematics course.

Mathematics, unlike the other disciplines, has a larger percentage of the outcomes occurring in the first two terms of courses. Eighty percent of outcomes occurred in the first term. An additional 15 percent occurred in the second.

Graph 14

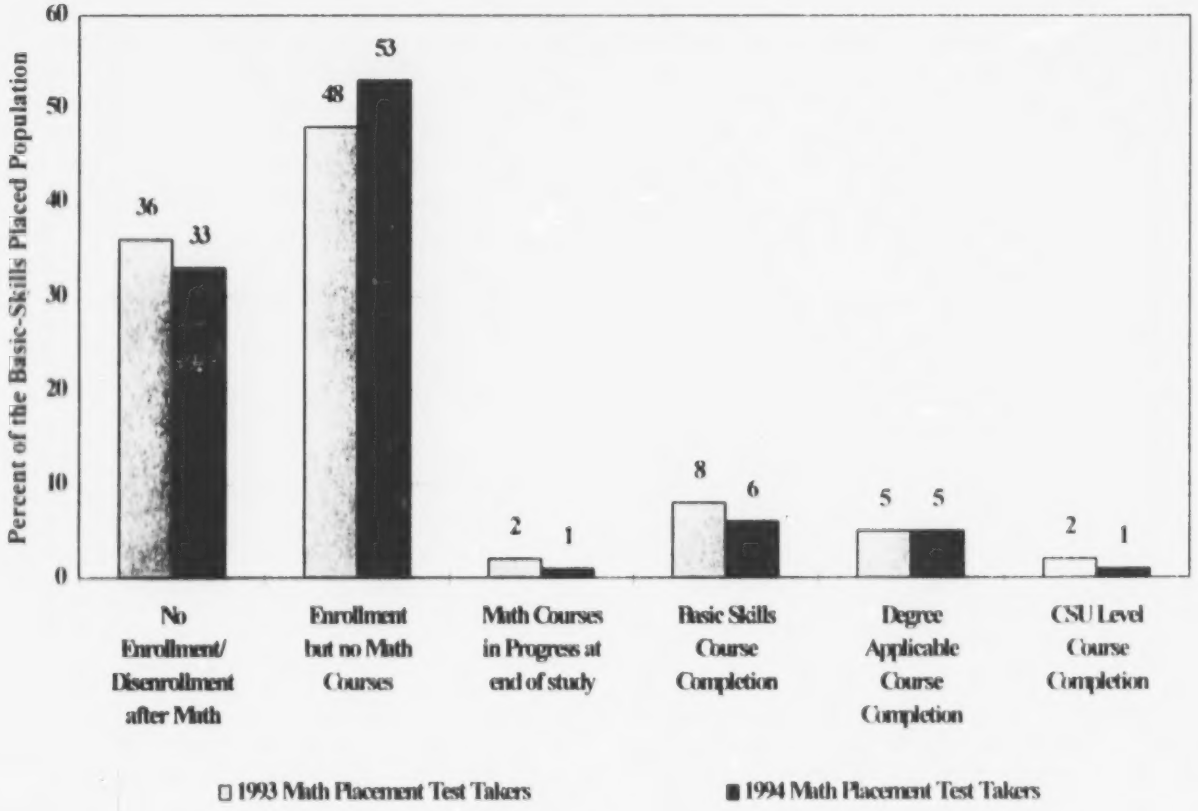
The Educational Outcome in Mathematics of 1993 and 1994 Test Takers in the Three Year Period Following Placement Testing



For basic-skills placed Mathematics test takers, goal attainment was less frequent (see Graph 15). Between 12 and 15 percent of these students passed a basic skills or higher course. Of this 12 to 15 percent, 6 to 8 percent passed only a basic skills level course. Five percent passed a degree applicable course. One to two percent passed a CSU level course.

Graph 15

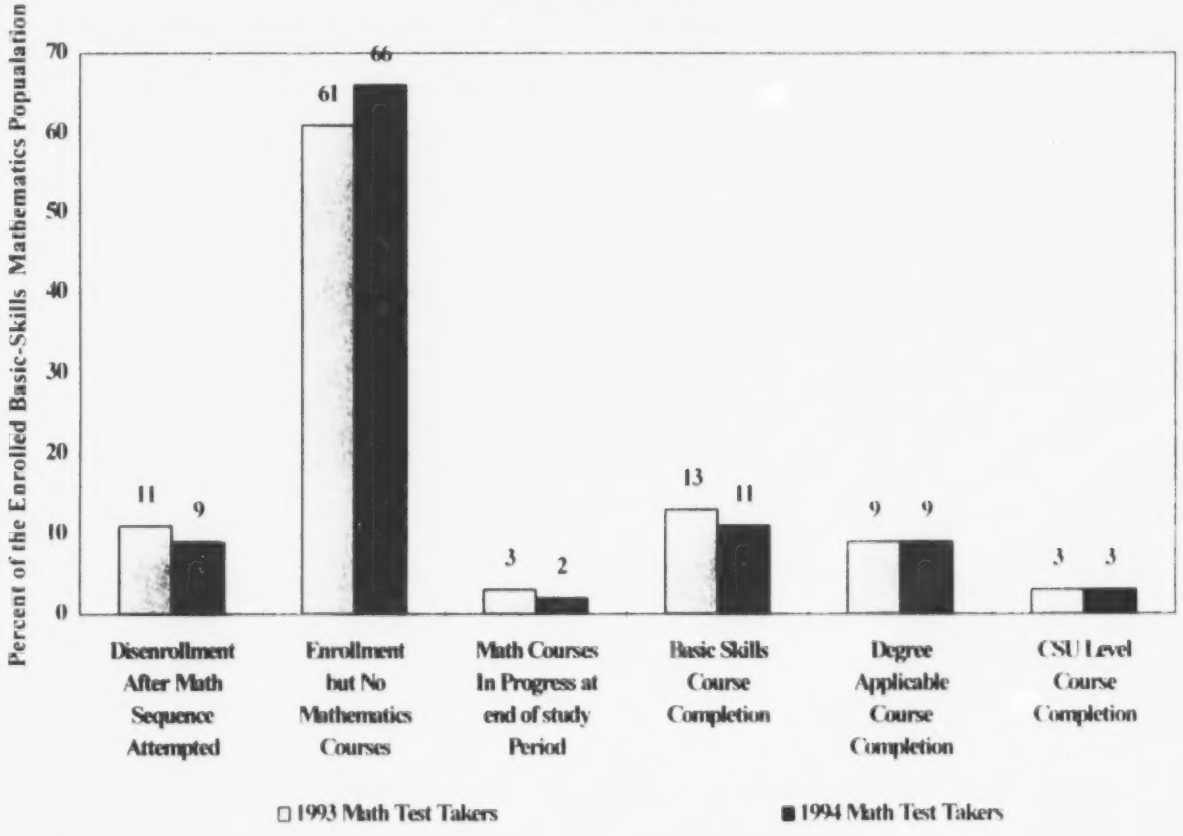
The Educational Outcome in Mathematics of 1993 and 1994 Basic-Skills Placed Test Takers in the Three Year Period Following Placement Testing



A closer look at basic skills students was taken by restricting the analysis to basic-skills placed test takers who said their goal was either a two or four year degree (see Graph 16). Between 23 and 25 percent of this group passed a basic skills level or higher course. Eleven to 13 percent of this group passed a basic skills course only; another 9 percent passed a degree applicable course. Only three percent passed a CSU level course. Sixty-one to 66 percent of all test takers took no Mathematics course upon enrollment at CCSF. An additional 9 to 11 percent disenrolled after attempting a Mathematics course.

Graph 16

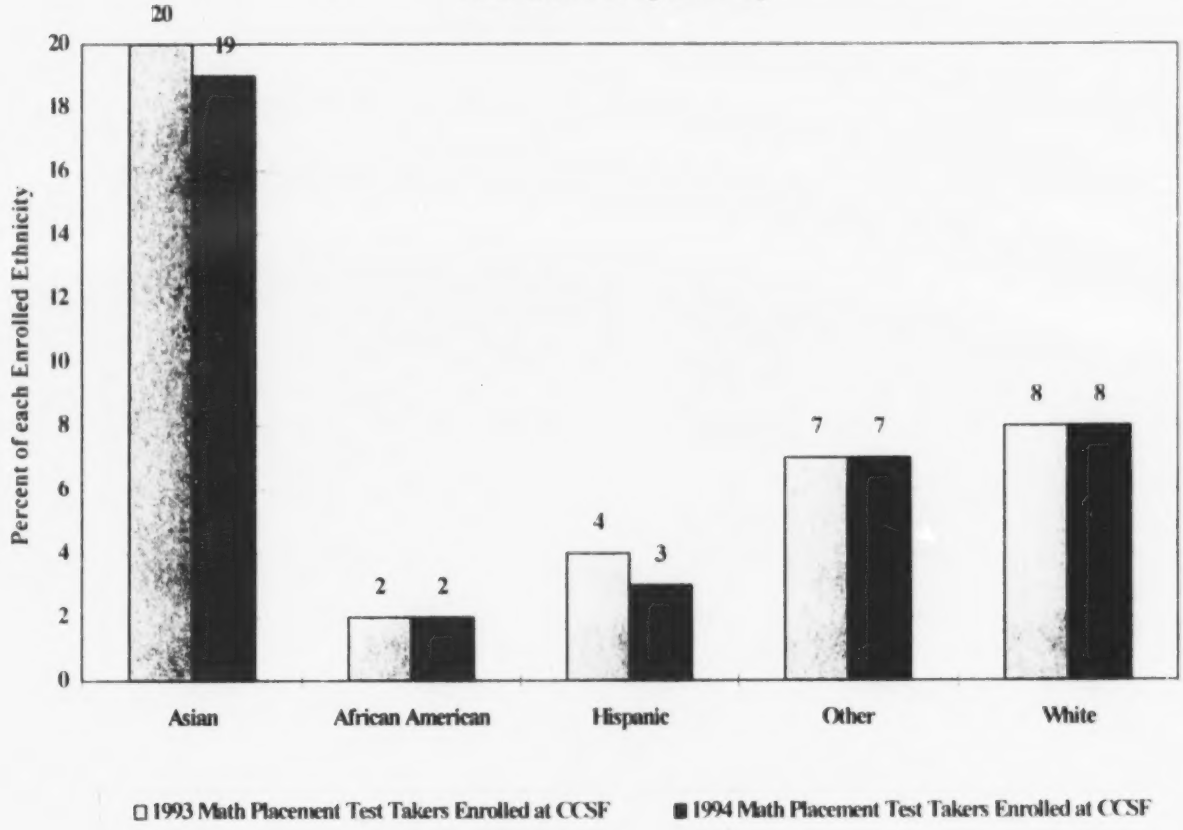
The Educational Outcome in Mathematics of Basic-Skills Placed Students Who Say a Degree is Their Goal



The relationship between educational outcome and both ethnicity and first course grade outcome was also significant in both a statistical and practical sense (see Graph 17). There was considerable variability by ethnicity in the percentage of each group passing a CSU level course. Twenty percent of Asian students achieved this benchmark followed by eight percent of White, three to four percent of Hispanic/Latino and two percent of African American students.

Graph 17

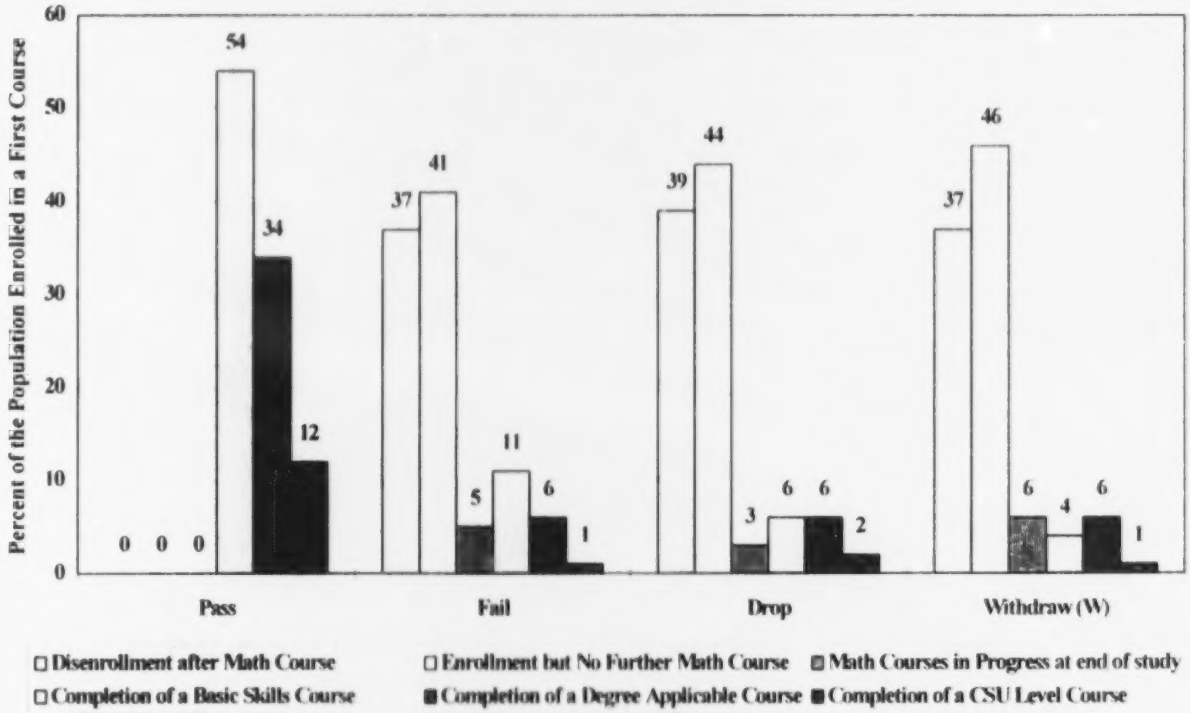
The Successful Completion of a CSU Level or Higher Course in Mathematics by Ethnicity



Another finding showed basic-skills placed students varied in their educational outcome by the first course grade outcome (Graph 18). Passing a first course automatically qualifies a student as having attained at least a basic skills level of ability in Mathematics. Therefore it is not possible for students who passed a first course to be categorized in the negative or neutral categories. Fifty-four percent of basic-skills placed students passed a first Mathematics course thus achieving the basic skills benchmark. Another 34 percent who passed a first course went on to successfully complete a degree applicable course; 12 percent went on to pass a CSU level course. On the other hand, for students who failed their first course, only 24 percent had a positive outcome or had courses in progress in the last term examined. Similarly only 18 percent of students who dropped and 19 percent of students who withdrew from a first course went on to attain a similar goal.

Graph 18

The Educational Outcome in Mathematics of Basic-Skills Placed Students by First Course Grade Outcome (1993 and 1994 combined)



The Mathematics placement test-taking populations of 1993 and 1994 were analyzed by a number of other variables. These variables included placement compliance, delay in enrollment in a first and second course, grade outcome in the first six sequential courses, unit and course load within each discipline and retention at CCSF. They also included background variables of age, gender and educational objective. While these variables and their relationship to educational outcome are not graphed in this report, a brief mention of the findings relating to

them is presented here. Of the background variables of age, ethnicity, gender and educational objective, ethnicity was the most strongly related to placement, retention and success. Asians were more than twice as likely as Whites to complete a CSU level Mathematics course. While White students received a somewhat lower placement level, they did better in a first course than Asians. Perhaps the reason that Asians were more likely to complete a transfer level Mathematics course in greater percentages than White students is that they stayed at CCSF longer. White students were retained at half the Asian rate which probably was the root cause of their failure to achieve higher educational levels in Mathematics.

Age, gender and educational objective were somewhat related to placement, retention and success. Younger students and students whose educational goal was a degree were less likely to receive a basic skills placement and more likely to pass a CSU level course. Students whose educational objective was job related were more likely to receive a basic skills placement, were less well retained, and were much less successful than students whose educational objective was either personal or degree oriented.

Institutional variables were also related to success. Graph 18 (page 25) shows a relationship between the passing of a first course and educational outcome. How students did in a first term Mathematics course was the most important factor in long term success. The path to success was tracked from course to course. Sixty-two percent of students who passed a first semester course went on to a second term in Mathematics. This compares to 52 percent or less of students who failed or withdrew from their first term course. Similarly, 60 percent of students who passed a first term course passed a second course while between 30 and 40 percent of students who withdrew, dropped or failed did similarly. Finally, students who enrolled in a following higher course were more likely to pass that course (55 percent passing) than students who re-enrolled in the same course again (35 percent passing). This was the pattern that eventually led to the successful completion of a transfer level Mathematics course. Twelve percent of basic-skills placed students who passed their first Mathematics course went on to reach this benchmark. Only seven percent of basic skills placed students who failed or withdrew went on to achieve a similar feat.

Given that first course success is important, the question is how successful were students in a first course? In Mathematics, 36 percent of basic skills placed students passed a first course versus 51 percent of more highly placed students. This percent may seem low but it must be remembered that it is a percentage of all students including those who passed, failed, withdrew or dropped an ESL course. Large differences exist by ethnicity. Over 50 percent of White students passed a first course compared to 48 percent of Asian, 33 percent of Hispanic/Latino and 23 percent of African American students.

What institutional variables affect first term course success in Mathematics? Placement compliance, delay in taking a first course, and number of enrolled courses and enrolled units were examined. In Mathematics, student enrollment in a course lower than the one placed into was somewhat related to passing a first course. However, more strongly related to first course success was student enrollment in complete versus partial course sequences. In Mathematics the only concurrent sequence of multiple courses was at a basic skills level with Mathematics E and 840. The percentage of those students passing who enrolled in both courses versus only one increased from 45 to 60 percent. When unit load in Mathematics was examined, passing percentage increased from 35 percent for students taking two units to 75 percent for students

students taking seven units. At greater unit loads passing percent declined to under 60 percent. This again leads to the question of intensity. Is the intensity of study in Mathematics related to success?

The difference between the passing rates for basic-skills versus all students may be a function of the intensity of the basic skills Mathematics course. Mathematics E is a two unit self paced course. Higher level courses are nearly all three or more units. The hypothesis of a relationship between course intensity and success in Mathematics has received independent confirmation in a sabbatical study by Keith McAllister.[4] McAllister compared the success of students in intermediate algebra both before and after it was changed from three to five semester units. He found passing rates increased from 47 to 54 percent. Moreover, success in a following Mathematics course increased from 56 to 63 percent for these students. He attributes this increase to both the higher unit load in the new algebra course, and to new material taught in it.

[4] In 1998 Keith McAllister, Chair of the Math Department at CCSF, completed the study "Increased Student Success after Changes in Intermediate Algebra." Available from the Office of Research, Planning and Grants.

CONCLUSIONS

This report is a summary of three studies conducted in the 1997-1998 school year. These studies looked at the educational outcomes of students who took the CCSF placement tests in 1993 and 1994 and the background and institutional variables that might be related to them. The educational outcomes and the most significant relationships that affected retention and success have been culled from those studies and presented in this report.

In all three disciplines, similar trends are evident. Twenty percent of test takers failed to enroll at CCSF. Roughly half of each test taking population placed at a basic skills level. Basic-skills placed students had somewhat less success than more highly placed students especially in the successful completion of transfer level courses. Greater percentages of these students either failed to enroll at CCSF or failed to enroll in the discipline that was the focus of the placement test they took. When they did enroll, they experienced less success and either dropped out of the discipline sequence or out of the college more often than those placed higher. Even when the analysis of outcomes was restricted to basic-skills placed students who said a degree was their objective, many students failed to pass any of the courses that define the benchmarks of success.

When background variables were examined, ethnicity in particular was strongly related to success. In ESL, Hispanic/Latino students did somewhat less well than other students. In English, the successful attainment of a CSU level or higher course by African-American students was half that of Asian students. In Mathematics, a ten fold difference in success existed between these groups of students while Asians succeeded at between two and five times the rate of Hispanic/Latino and White students.

Part of this difference in success by ethnicity may be related to placement. Although placement level did not differ greatly by ethnicity in ESL, differences were great in English and Mathematics. In English, roughly two-thirds of minority students received a basic skills placement. Only slightly more than a quarter of White students placed at a similar level. In Mathematics, about 70 percent of African American and Hispanic/Latino students placed at a basic skills level compared to about a third of Asian and 42 percent of White students. Lower placing students generally had more difficulty in being successful than higher placing students. Basic skills placed students passed a transfer level course least frequently. This may be because of the greater number of courses that they must take to reach the transfer level. It may also be due to the greater difficulty basic skills placed students have in passing a first course. Especially in Mathematics, students who took a basic skills course passed in notably lower percentages than more highly placed students who enrolled in higher level courses.

The problem with either failure or withdrawal is that it lowers the probability of re-enrollment in the discipline sequence of courses and if students do re-enroll, it lowers the probability of passing the second course. If students are tracked over time, those students who start out by failing a first course are less likely to pass a transfer level class in a later semester than students who pass a first course.

The lesson to be learned from this is that beginnings are important. Initial success leads to retention and later success. The question is what can the institution do? Are there any variables under the control of the college that might increase the success of students? Three variables

were examined that are under institutional control. These are placement compliance, delay in taking a first course, and number of first courses and units taken.

Students who enrolled in the correct course in ESL were more likely to pass that first course. The same was true but to a lesser extent in English. Mathematics students who enrolled in a lower first course than placed into had the most success. Immediate enrollment in a first course was also related to successful completion of that course in ESL. Delay did not seem to affect success in English and Mathematics.

These results are similar to findings reported in an earlier study conducted at the college.[5] Matriculation services need to stress the importance of enrolling in the correct course. If Mathematics students who enroll in lower than placed course are more likely to succeed, changes in math placements may need to take place.

The one institutional variable that was related to success in a first and later course was number of courses taken concurrently within each discipline. The more within-discipline courses taken concurrently, the greater percentage of students who passed. Moreover, for students who were placed into multiple concurrent courses within a discipline, those students who enrolled in the complete sequence did better than those students who enrolled in only one of the two or three courses. This was true in English in the English 90 and English 9 sequence, in Mathematics in the Mathematics E and Mathematics 840 sequence, and in ESL in a whole range of courses. Indeed, when students enrolled in the complete sequence, they had passing rates roughly 15 percent higher than those students who enrolled in the partial sequence. A final check of this finding was done by looking at enrolled units within a discipline. Passing percent increased by about four percent per unit as units within a discipline increased to between seven and nine. Then it fell for enrolled units that exceeded this number.

The relationship between success and enrolled units within a discipline was a quadratic one. The implication is that intensity of study within a discipline affects success. Multiple courses, or courses that require more time in class per week lead to greater success.

The difference in passing rates between the different disciplines of English, ESL and Mathematics may be partly due to differences in intensity. Over 60 percent of ESL students pass their first course. Forty percent of ESL students take more than one ESL course concurrently. Fifty percent of English students and 45 percent of Mathematics students pass their first course. However, only five percent of Mathematics and English students take more than one course. Moreover, within-discipline unit load varies greatly. In Mathematics for example, the basic skills course (whose pass rate is 35 percent) is a two unit course. In English, basic skills courses (whose pass rates are 48 percent) are generally three units. In ESL, these courses (whose pass rates are 59 percent) are five or more units.

The intensity hypothesis must be tempered by alternate explanations. One alternate explanation is that students who enroll in multiple courses or courses with more unit value are either more motivated or of higher capability than those students who enroll in either fewer

[5] "The Impact of Matriculation Services on Student Progress and Success at City College of San Francisco," 1998. This was a joint research project of the Office of Research, Planning and Grants and the Office of Matriculation and Assessment.

courses or courses with lower unit values. To determine which hypothesis is the most valid, these hypotheses need to be experimentally investigated. Moreover, the interaction of intensity of study with ethnicity needs to be examined to determine whether intensity of study has an equally beneficial effect for all ethnicities.

If intensity of study contributes to success, and delay in taking classes does not affect success in Mathematics, barely affects success in English, and does affect success in ESL, changes can be made in how courses are sequenced. Students should start with ESL or English classes. They should enroll in multiple courses within each discipline if placement requires it. If not, have them enroll in other courses that are linked to these courses and which might supplement and complement the learning that occurs in them. After these courses are finished, have students enroll in Mathematics courses. Multiple course enrollments in Mathematics, enrollment in Mathematics courses that require a greater time investment, or linked classes that complement Mathematics learning may help students pass these courses. In short, fewer subject matter areas studied more intensively in the first two semesters of attendance may well increase success and lead to increased retention as well as lead to increased numbers of students achieving higher educational levels.

While two thirds to three quarters of all students taking the placement test at CCSF failed to achieve any success in English, ESL and Mathematics, those statistics can change with the understanding that beginnings are important and the intensity of study matters. Degree seeking students must be directed to the courses they need for transfer. They must also be directed to initial courses whose focus and intensity aids them in achieving their goals. One way of adding intensity is to add hours and units to problem or bottleneck courses. Other ways to add intensity might be to add tutoring, study groups, supplemental instruction or adjunct courses. Currently learning communities are being investigated at CCSF. These may well add to the success of students by also adding to the intensity of study through linked courses. These and other remedial interventions are discussed in depth in other studies.[6] However, the effect of all of these interventions is, at least in part, to increase the intensity of study.

If new students' initial success is improved by adding intensity in each subject matter area, that initial success should carry on to future semesters and lead to a more frequent completion of transfer level courses. Other institutional variables that the college controls may also play a part in the improvement of learning and success and, consequently, need to be examined. These variables include among others class size, time of day, number of meetings per week and length of each meeting. The institution needs to consider all of these variables, and when significant relationships are found between them and the success of students, changes suggested by these variables need to be made. In the present case, the institution needs to consider restructuring its course offerings as suggested earlier and needs to consider making counseling changes that will better serve its students.

[6] "Replacing Remediation with Acceleration in Higher Education: Preliminary Report on Literature Review and Initial Interviews. Draft March 1998. National Center for Postsecondary Improvement, Stanford University, School of Education.